

REMARKS/ARGUMENTS

The Applicant thanks the Examiner for the Office Action dated June 29, 2009.

Claim Objections

The term “in which” has been replaced with “wherein” throughout the claims.

A colon has been inserted in claims 1 and 29, in accordance with the Examiner’s suggestion.

Claim Rejections – 35 USC § 112, first paragraph

Claims 23 and 42 have been cancelled. However, the Applicant questions why this rejection should be raised at this late stage of examination when this feature was present in the claims as originally filed. In the Applicant’s submission, this amounts to piecemeal examination of the present application.

Claim Rejections – 35 USC § 112, second paragraph

Responding to each rejection under 35 USC 112, second paragraph:

- (1) Claims 1 and 29 have been amended so as to explicitly recite the step of “calculating the position of the nib”. Thus, the final ‘wherein’ clause is now clearly referring to this calculation step.
- (2) The term “perspective transform” is well defined in the specification at page 19, lines 5-22:

The four perspective target structures 17 are the last to be located (at 30). Good estimates of their positions are computed based on their known spatial relationships to the ring and axis targets, the aspect and rotation of the ring, and the rotation of the axis. Matching proceeds by applying the ring’s normalizations to each shape’s moments. Once their second-order moments are normalized the circular perspective targets are easy to recognize, and the target closest to each estimated position is taken as a match. The original centroids of the four perspective targets are then taken to be the perspective-distorted corners 31 of a square of known size in tag space, and an eight-degree-of-freedom perspective transform 33 is inferred (at 32) based on solving the well-understood equations relating the four tag-space and image-space point pairs (see Heckbert, P., Fundamentals of

Texture Mapping and Image Warping, Masters Thesis, Dept. of EECS, U. of California at Berkeley, Technical Report No. UCB/CSD 89/516, June 1989, the contents of which are herein incorporated by cross-reference).

The inferred tag-space to image-space perspective transform is used to project (at 36) each known data bit position in tag space into image space where the real-valued position is used to bilinearly interpolate (at 36) the four relevant adjacent pixels in the input image. The previously computed image threshold 21 is used to threshold the result to produce the final bit value 37.

And the use of the perspective transform is defined in the specification at page 20, lines 1-5:

The obtained tag data indicates the identity of the region containing the tag and the position of the tag within the region. An accurate position 35 of the pen nib in the region, as well as the overall orientation 35 of the pen, is then inferred (at 34) from the perspective transform 33 observed on the tag and the known spatial relationship between the pen's physical axis and the pen's optical axis.

From the passage of the specification at page 19, lines 5-22, the person skilled in the art is armed with more than enough information to determine the perspective transform, if necessary with reference to the cross-referenced publication in the text, or indeed one of the Applicant's cross-referenced applications (e.g. US Application No. 09/575,154 identified on page 1 of the specification).

(3) Claims 1 and 29 have been further amended so as to make it clear that the perspective targets in the position-coding pattern are used to determine the perspective transform. Moreover, claims 1 and 29 explicitly specify that these targets are perspective-distorted due to the tilt of the pen (as shown in Figure 8). The skilled person would be readily able to determine the perspective transform once the perspective-distorted targets have been imaged by the image sensor, since the relevant equations are well understood.

(4) The preamble of claims 1 and 29 have been amended in accordance with the Examiner's suggestion by deleting the term "enabling".

(5) Claim 10, 12, 15 and 43 have been amended so as to avoid any confusion with respect to 35 USC 112, sixth paragraph. The term "means" has been removed from these claims.

(6) Claims 21, 23 and 46 have been clarified by replacing the term "its" with the appropriate term having antecedence in the respective claim.

It is respectfully submitted that all of the Examiner's objections have been successfully traversed. Accordingly, it is submitted that the application is now in condition for allowance. Reconsideration and allowance of the application is courteously solicited.

Very respectfully,

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